1 SCOPE

The purpose of this document is to detail the use of the Nanometrics Nanospec AFT. All users are expected to have read and understood this document. It is not a substitute for in-person training on the system and is not sufficient to qualify a user on the system. Failure to follow guidelines in this document may result in loss of privileges.

2 REFERENCE DOCUMENTS

- Nanospec AFT Instruction Manual

3 DEFINITIONS

n/a

4 TOOLS AND MATERIALS

4.1 **General Description –** The Nanospec is used to measure the thickness of a variety of film types. The range and index of refraction for each film is indicated in the table in section 6.3.

5 SAFETY PRECAUTIONS

5.1 Hazards to the Operator

5.1.1 Only operate with all covers in place.

5.2 Hazards to the tool

5.2.1 The Nanospec is a delicate optical instrument. Use care when operating.

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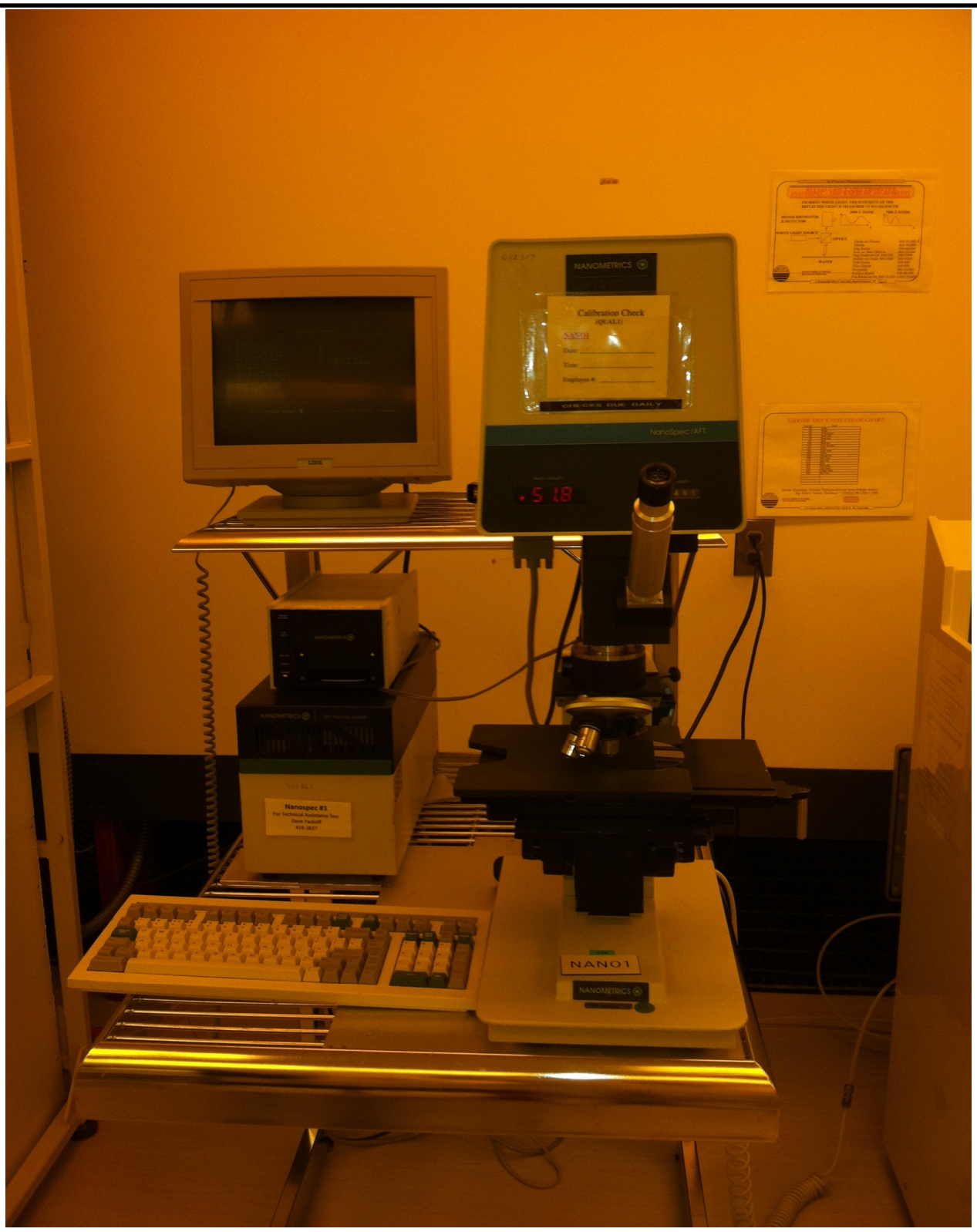

NANOMETRICS
Calibration Check
(QUAL)
CHECKS DUE DAILY
NanoSpec/AFT
Nanospec #1
NANO1
NANOMETRICS

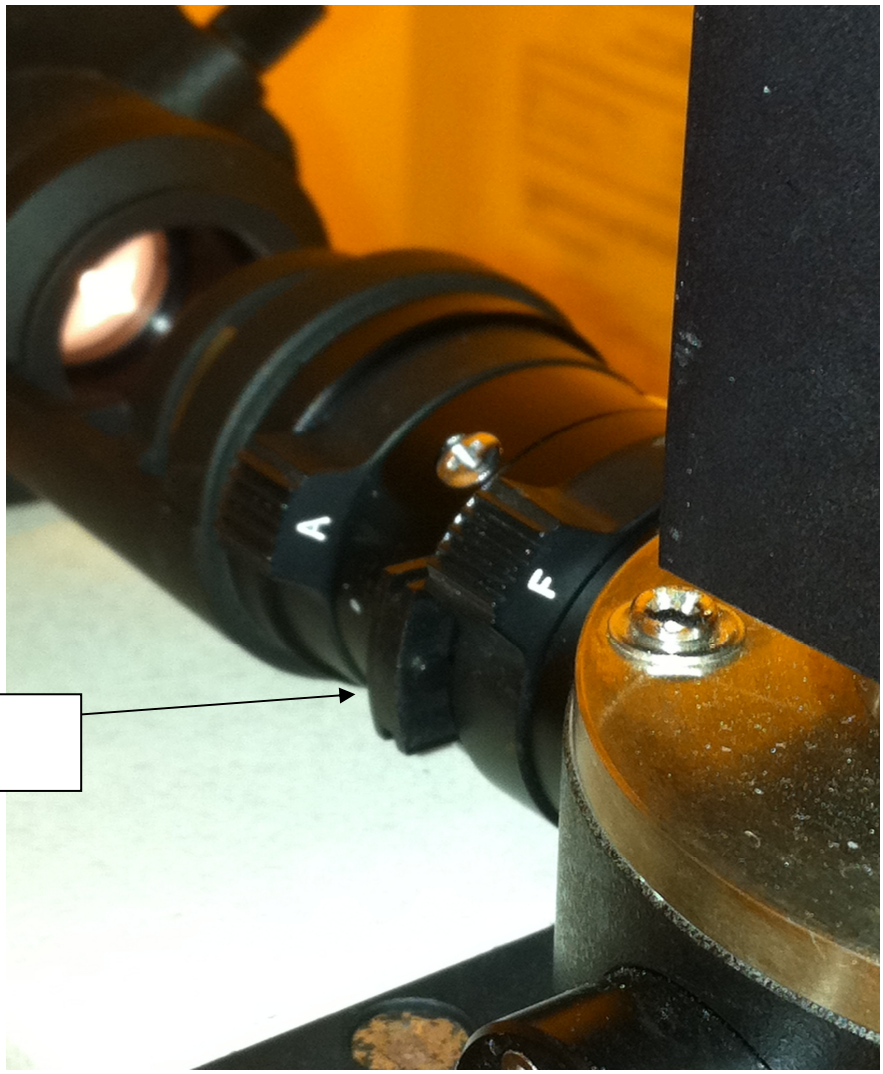
6 INSTRUCTIONS

6.1 Initial State Check

6.1.1 Usually the Nanospec and terminal are left on. The lamp may be dimmed. If the system is off go to **Section 6.2**.

6.1.2 If the lamp is dim, turn on the toggle switch on the top left of the back of the Nanospec control unit. The lamp is on when the switch is up.

6.1.3 Verify that the filter located on the illuminator tube is in the "in" position. This can be confirmed by moving it to the point of lowest intensity. All the way to the left should be in.



Filter, slide all the way left to in position

6.2 Powering up the system from an off state

6.2.1 Turn on the terminal with the switch on the right side of the monitor.

6.2.2 Turn on the Nanospec control unit with the red toggle switch on the bottom left of the control unit.

6.2.3 Enable Data Link "NO".

6.2.4 Turn on the printer. The power is on the back.

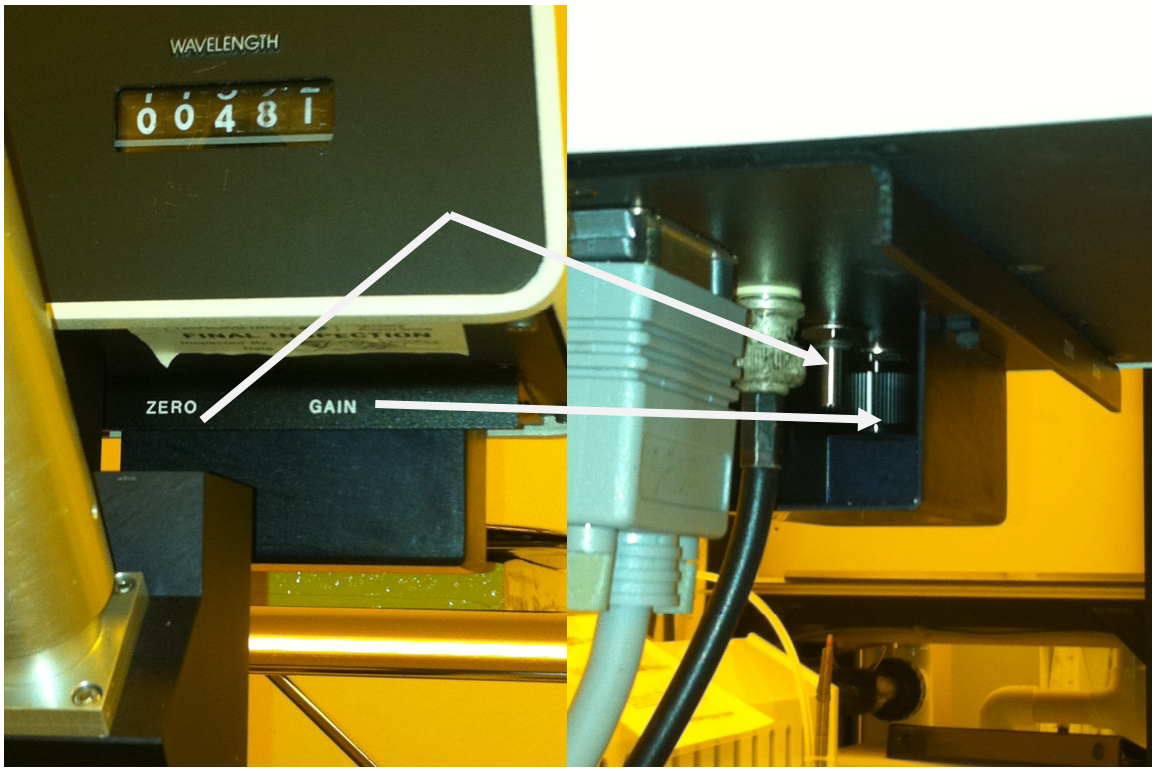
6.2.5 The system will ask if the wavelength is 480. If it is, select the **Yes** button on the keypad. If not, enter in the displayed value and the system will reset.

6.2.6 Answer **Yes** on the keyboard for the refractive index option.

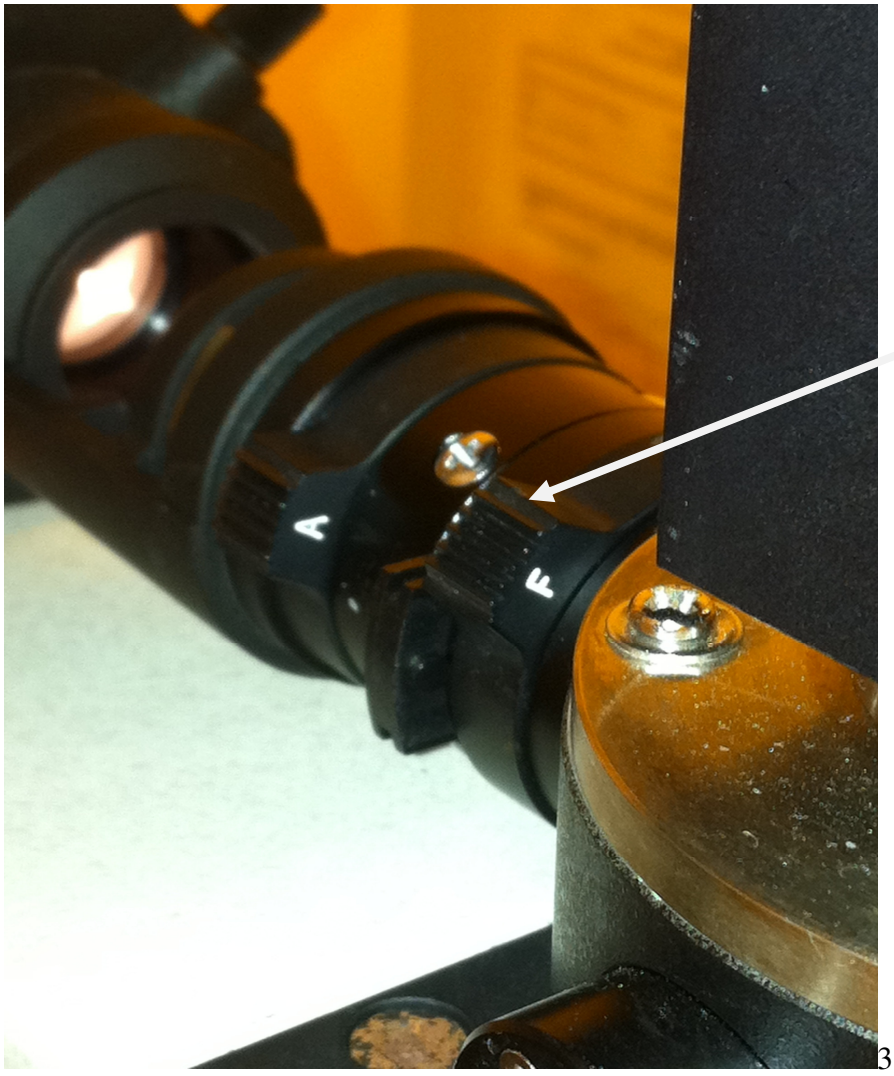
6.2.7 Answer **Yes** on the keyboard to enable the printer.

6.2.8 Press **Enter** on the keyboard.

6.2.9 Adjust GAIN to the values shown on the screen.



6.2.10 Turn Turret to 5X lens and adjust “F” to the smallest size octagon and focus on the wafer.



Adjust for smallest octagon in the eye piece.

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6.2.11 Position lens turret between two lenses and adjust zero.

6.3 Taking a Measurement

6.3.1. Get to the program list by pressing **Calib** on the keyboard.

6.3.2. Select a program from the following list:

	Program	Index	Range	Filter
1	Oxide on Si	1.45	400-30,000A	in
2	Nitride on Si	2.00	400-10,000A	in
3	Negative Reist on Si	1.55	500-40,000A	in
4	Polysilicon on Oxide	3.00	400-10,000A	in
5	Negative Resist on Oxide	1.55	4,000-30,000A	in
6	Nitride on Oxide	2.00	300-3,500A	out
7	Thin Oxide on Si	1.45	100-500A	in
8	Thin Nitride on Si	2.00	100-500A	in
9	Polyimide on Si	1.78	500-10,000A	in
10	Positive Resist on Si	1.64	500-40,000A	in
11	Positive Resist on Oxide	1.64	4,000-30,000A	in
12	Reflectance Mode			in
13	Thick Films			in

6.3.3 You will be prompted to enter the Objective Lens. For most applications select 1 for the 10x objective.

6.3.4 When prompted to Scan a New Reference, select **Yes** on the keyboard.

6.3.5 Focus on the blank silicon reference wafer with the filter in. Use the octagon to help focus. If the octagon is not visible, it can be put in place by rotating the field diaphragm on the illuminator tube of the Nanospec.

6.3.6 Because different Nanospecs have different PMT's follow the onscreen instructions for each Nanospec matched set to adjust Zero and Gain.

6.3.7 Rotate the lens turret to eliminate the light. Set zero between 0.5-1.0.

6.3.8 Rotate the lens turret back to the wafer view.

6.3.9 Enter a sample number if desired. If you Program 6, Nitride on Oxide is selected, you will be prompted to move the filter out. The intensity will increase when this is done.

6.3.11 If prompted to enter the refractive index, press **Enter** to accept the default value or type in the desired number.

6.3.12 Focus on the feature that will be measured. The black circle in the center of the view is the area that will be measured. If the black circle is too large, go back and select a different objective lens.

6.3.13 Press the **MEAS** button on the keyboard to start the measurement.

6.3.14 The **New Test** button on the keyboard will allow you to change the sample number and keep the same program number.

6.3.15 The **Calib** button on the keyboard will allow you to start over and select a new program number.

6.4 Errors during Run

6.4.1 If the system locks up during use, turn off the monitor and the Nanospec control unit. Follow the instructions in 6.2 to power the system back up.

6.4.2 If unsure of the filter position, move it to the point of lowest intensity. This will be the "in" position.

REVISION RECORD

Summary of Changes	Originator	Rev/Date
Original Issue	Sean O'Brien	A-06/01/2009
Reflects differences between Nano #1 and Nano #2	Bruce Tolleson	B-03/28/2011
Changed Gain adjust to the displayed values step 6.2.9	Bruce Tolleson	C-09/03/2020
Correction of calibration procedures for different PMT's	Bruce Tolleson	D-01/27/2021